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International Energy Biweekly Review

29 November 1978

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INTERNATIONAL ENERGY BIWEEKLY REVIEW

29 November 1978

Overview	1
Although the recovery of Iranian oil production has been more rapid than anticipated, political and technical factors will hamper attempts to increase output from the current 5.7 million b/d level. The tightening of the oil market because of the oil supply disruptions in Iran has increased the odds that OPEC will approve a total 1979 oil price increase of more than 5 percent in December.	
OPEC: Next Year's Prices Still in Doubt	3
A majority of OPEC states are seeking a 10-percent increase in the price of crude oil. Saudi Arabia is, however, reluctant to agree to a raise this high. An increase of 7 to 10 percent in 1979, perhaps divided into two or more increments, appears likely at this time, but a final decision has not yet been made.	
OPEC: Purchasing Power Decline	5
The real value of OPEC oil revenues has fallen about 20 percent since the first quarter of 1977. The loss differs widely among OPEC members because of differences in import mix, and, even more, because of differences in supplier nations.	
USSR: Economic Performance and the Energy Sector	9
This will be another year of slow growth in the Soviet economy with GNP growth probably falling below the 1977 level of 3.5 percent. Growth in primary energy will be only about 4 percent. The Soviets have stepped up orders for oil- and gas-related equipment.	
Japan: Independent Uranium Enrichment Capability	11
Japan expects to begin enriching uranium next year in a gas centrifuge pilot plant now under construction. This pilot facility will have the potential capacity to provide about half of Japanese enrichment needs in the late 1980s and 1990s. Japan is also committed to heavy foreign purchases of enrichment services.	

i
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25X1

INTERNATIONAL ENERGY BIWEEKLY REVIEW

(Continued)

25X1

Chinese Oil Trickles Into United States 18

The sale of 3.6 million barrels of crude to a US company represents only a small increase in Chinese crude exports and is to some extent a political gesture.

Sweden's Nuclear Power Program 19

The new Swedish Government announced in mid-November that only 11 reactors of the original 13-reactor program would be completed.

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25X1

INTERNATIONAL ENERGY BIWEEKLY REVIEW

Overview

Oil production and exports in Iran are approaching prestrike levels according to industry data. On 27 November, output and exports were 5.7 million b/d and 4.9 million b/d, respectively, compared with 6.1 million b/d and 5.3 million b/d in mid-October.

Recovery has been more rapid than anticipated [redacted] but some still believe that the Oil Services Company of Iran (OSCO), which produces about 90 percent of Iran's oil, will have problems increasing output beyond its current 5 million b/d level. [redacted]

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[redacted] Even maintaining output at current levels may prove difficult. A major supplier has stopped delivery of spare parts to Iran because of the work slowdown at the port. [redacted]

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OSCO prestrike capacity was 5.9 million b/d of a total Iranian capacity of 6.5 million b/d. All four of Iran's offshore joint ventures have resumed operations and their production is almost at prestrike levels.

The labor situation in the oilfields, although improved, remains unstable. Eighty percent of OSCO workers were reported on the job as of 21 November, but many are still disgruntled and unproductive. The Shah's opponents apparently are readying their forces for new disturbances during Moharram, the month of mourning which begins in early December. Ayatollah Khomeini, the leader of the religious opposition, reportedly has called for a stop in oil exports during Moharram.

Despite the improvements in production, OSCO customers—mainly the major oil companies—may have to continue efforts to find oil to replace much of their expected shares of Iranian crude. When loadings originally scheduled for October are completed at the Kharg Island export facility, NIOC reportedly plans to give its direct customers loading preference. [redacted] NIOC will take 50 percent of the crude available for export from November through February, compared with less than 30 percent before the strike. OSCO is attempting to convince NIOC to go along with the previous sharing arrangements.

Note: Comments and queries regarding this publication are welcome. They may be directed to [redacted] of the Office of Economic Research, [redacted]

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Saudi Arabia remains the only major oil exporter to have significantly increased production in response to the Iranian shortfall. Aramco output reportedly averaged 10.2 million b/d for the first half of November compared with an average of 9 million b/d in October. Indonesia hopes to take advantage of the interruption of Iranian crude shipments by suggesting to the Japanese that they replace Iranian crude with Indonesian crude, despite gravity differences. Indonesia apparently is prepared to offer a discount from prices to be decided at next month's OPEC meeting through the application of lower differentials.

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The tightening of the oil market as a result of reduced Iranian output over the past five weeks has made it likely that the OPEC conference will approve a 1979 oil price boost of more than 5 percent; a total 1979 increase of 7 to 10 percent appears at this time to be the most likely outcome. A bargain involving Saudi agreement to one or more small price increases later in 1979 in return for an initial hike of less than 10 percent in January remains a good possibility.

A majority of OPEC states are seeking a price increase of 10 percent or more. Iran has shifted its position from support for a Saudi effort to limit a January increase to 5 percent to a willingness to go along with the consensus; the Saudis can now count on support from only the UAE and Qatar.

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OPEC: NEXT YEAR'S PRICES STILL IN DOUBT

OPEC is waiting until the last minute to decide on the increase in 1979 crude oil prices. Saudi Arabia's reluctance to agree to a raise as high as 10 percent is the main obstacle to a consensus. The odds now favor a total increase of 7 to 10 percent in 1979, perhaps divided into two or more increments. Oil ministers of the 13 cartel states are to meet in Abu Dhabi on 16 December to settle the issue.

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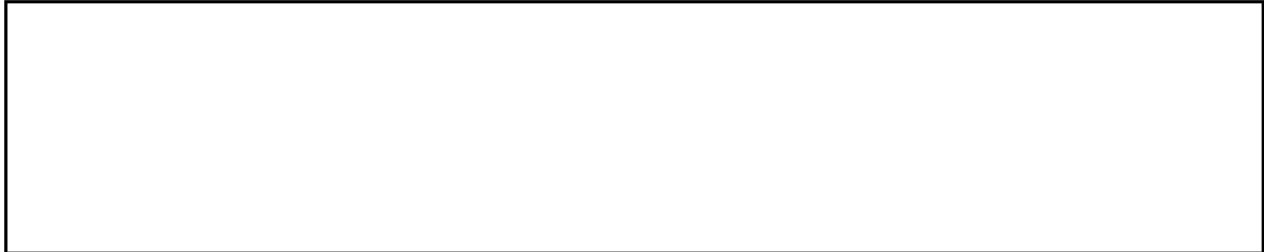


29 November 1978

SECRET

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SECRET



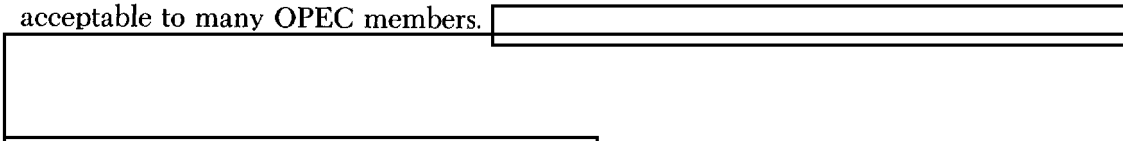
A majority of states still are seeking a 10-percent increase. Kuwaiti Oil Minister and current OPEC President Ali al-Khalifa al-Sabah and Venezuelan Oil Minister Hernandez are continuing to lead the lobby for such a hike. Both have met recently with Yamani. Iraq and other states, while arguing for a still larger increase realize that 10 percent is the biggest hike that realistically might win approval in December. US officials in Baghdad were informed that Iraq has not yet adopted a final position.

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Events in Iran have strengthened the hand of those OPEC states seeking a 10-percent price hike. Statements to the contrary by ministers of several key nations have been politically motivated; no OPEC member wants to offend the Shah by implying that problems will continue. The tightening of the oil market as a result of reduced Iranian production weakened one of the key arguments—the existence of an over-supply of oil—in favor of price restraint. The Iranians have lost an estimated 100 million barrels of production since late October. Although the loss has been partially offset by increased output in Saudi Arabia, liftings probably will not drop off as much as normal in the first quarter of 1979.

Iran's domestic troubles also leave the country in a poor position to support Saudi Arabia in OPEC. Before the oil strikes, Iranian officials were saying they would support a Saudi bid to limit a price increase to 5 percent; Tehran now says it will go along with the consensus. But lost oil revenues and the need to demonstrate that it puts Iranian interests ahead of US interests give Tehran reason to support a higher price increase.

There is some evidence that a phased increase in oil prices in 1979 would be acceptable to many OPEC members.



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A Kuwaiti newspaper reported on 27 November that OPEC already has agreed to raise oil prices by 2 percent each quarter in 1979—a total increase of just over 8 percent. While the formula would appear to represent a reasonable compromise, Kuwaiti newspapers have a history of inaccurate reporting.

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Some OPEC members see small and regular price hikes over the course of a year as an effective way to combat the sharp fluctuations in demand caused by buyer anticipation of larger and more infrequent price boosts. None has insisted that the full increase take place in January.

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OPEC: PURCHASING POWER DECLINE

The real value of OPEC oil revenues has fallen 20.1 percent since the last general oil price increase in January 1977. Losses of 18.1 percent due to the decline of the US dollar and 4.7 percent due to inflation in trading partner countries were partially offset by the 5 percent price increase taken by Saudi Arabia and the United Arab Emirates in July 1977.

The Causes of the Purchasing Power Losses

The loss in the real value of oil revenues differs widely among OPEC members because of differences in what they buy and, even more, because of differences in who provides the goods. Purchasing power losses since the first quarter of 1977 have ranged from 17.1 percent for Venezuela—which purchases one-third of its imports from the United States—to 28.8 percent for Indonesia, whose major industrial trading partner is Japan.* Since OPEC oil exports are priced and paid for in US dollars, changes in the value of the dollar relative to other currencies translate into changes in the real value of oil revenues. During the last two years the Japanese yen appreciated 48 percent against the US dollar, while the Canadian dollar fell 10 percent.

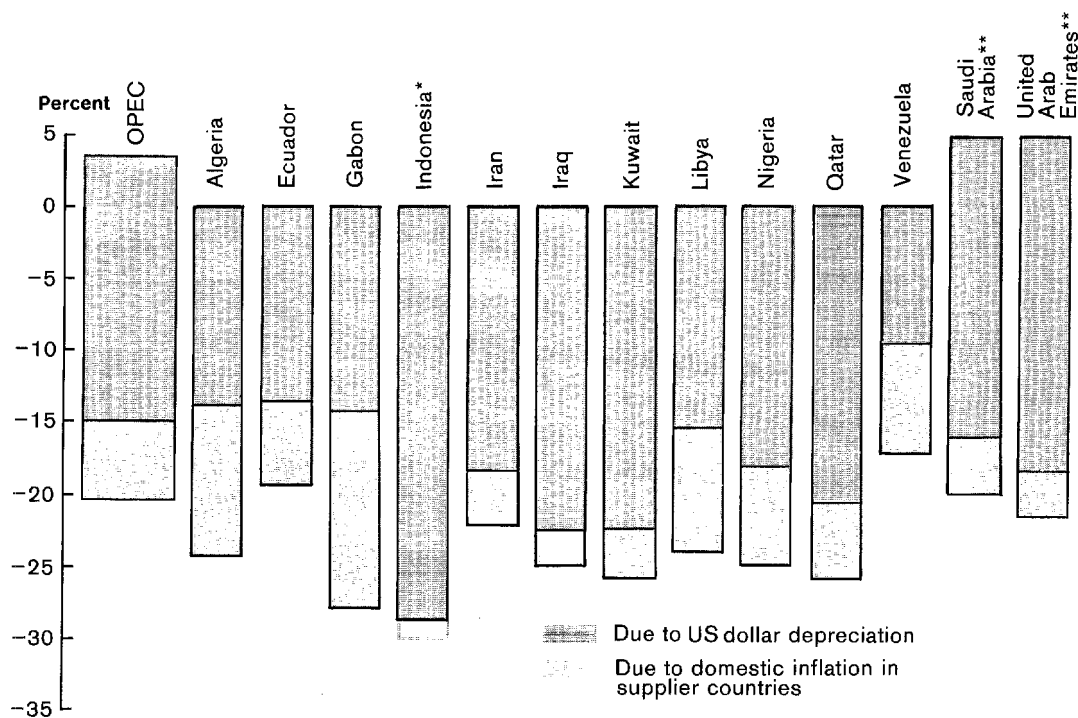
OPEC Financial Distress

OPEC imports are expected to total \$99 billion in 1978, up 17 percent from 1977. In most OPEC countries the rapid increase in import prices is largely responsible for higher import expenditures; growth in volume accounts for only 3 percent of the jump in overall OPEC import value. Nearly all of the 15- to 20-percent increase in import expenditures by Indonesia, Kuwait, Libya, and Qatar this year is being caused by spiraling import price inflation. In Iraq, Saudi Arabia, and the UAE, where development spending has increased, the increase in the dollar value of imports reflects moderate volume growth as well as higher import prices.

* While the yen has been appreciating rapidly, Japan has cut its export prices to retain its competitiveness. Thus, Indonesian import prices have not risen as fast as they would have otherwise.

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OPEC Countries: Loss of Purchasing Power From First Quarter 1977 Through Fourth Quarter 1978



*Domestic deflation in supplier countries has partially offset the loss of purchasing power due to US dollar depreciation.

**Saudi Arabia and the UAE raised their price for oil five percent in July 1977 to come in line with the other OPEC countries.

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The current account surplus of the OPEC countries is now expected to drop to \$5 billion in 1978, down from \$29 billion last year. Forty percent of the decline is being absorbed by Saudi Arabia, whose oil export earnings have dropped and import expenditures risen. Iran, too, is experiencing a large deterioration in its current account. The Iranians, who have been accustomed to running comfortable surpluses, will have a current account that is roughly in balance this year. Spending on imports increased rapidly early in the year and the total will come to \$2 billion more in 1978 than in 1977. Labor strikes in the fourth quarter will mean a loss of \$2 billion in oil earnings.

Several of the OPEC countries that were in deficit in 1977 are in even worse straits this year. Nigeria is tumbling deeply into deficit. Its spending on imports has

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OPEC Countries: Terms of Trade

Index: 1st Qtr 1974 = 100

	Oil Prices	Import Prices	Terms of Trade
1974			
1st Qtr	100.0	100.0	100.0
2nd Qtr	100.0	109.8	91.1
3rd Qtr	101.4	113.5	89.3
4th Qtr	108.2	117.7	91.9
1975			
1st Qtr	109.5	121.7	90.0
2nd Qtr	109.5	122.0	89.8
3rd Qtr	109.5	116.6	93.9
4th Qtr	119.3	117.0	102.0
1976			
1st Qtr	119.3	119.0	100.3
2nd Qtr	119.3	119.6	99.7
3rd Qtr	119.3	122.3	97.5
4th Qtr	119.3	123.8	96.4
1977			
1st Qtr	127.5	126.4	100.9
2nd Qtr	127.5	129.0	98.8
3rd Qtr	131.2	131.6	99.7
4th Qtr	131.2	135.5	96.8
1978			
1st Qtr	131.2	141.5	92.7
2nd Qtr	131.2	145.8	90.0
3rd Qtr	131.2	154.5 ¹	84.9 ¹
4th Qtr	131.2	156.3 ¹	83.9 ¹

¹ Estimated.

increased while oil revenues have declined. Despite import controls, import spending was up 26 percent in the first half of 1978. Nigeria appears, however, to be coming to grips with the import problem, and we expect imports in the last half to be down 4 percent. Nearly all import price inflation in Nigeria is due to dollar devaluation. Venezuela is also spending its way into a deeper deficit. Although enjoying relatively favorable import prices because dollar imports make up a large share of the total, an increased volume of purchases means that Venezuela's import bill will be up 21 percent in 1978.

In Algeria, Ecuador, and Gabon, import spending in 1978 has been tightly constrained by growing debt service burdens and decreased oil revenues. In Algeria import expenditures will have fallen an estimated \$100 million in 1978, largely because of a continued shortage of development funds. Import spending is also falling in Ecuador; rising import prices will cause import volume to decline by 19 percent—the largest drop of any OPEC member. Ecuador will, however, be forced to

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OPEC Countries: Oil Exports

	1978		
	Jan-Sep	Oct-Dec	Jan-Dec ¹
Total	27,400	29,620	27,970
Algeria	1,010	1,010	1,010
Ecuador	140	160	150
Gabon	200	200	200
Indonesia	1,360	1,350	1,360
Iran	5,100	3,700	4,750
Iraq	2,190	2,680	2,310
Kuwait	2,040	2,280	2,100
Libya	1,910	2,190	1,980
Nigeria	1,730	2,040	1,810
Qatar	470	520	480
Saudi Arabia	7,590	9,500	8,070
United Arab Emirates	1,810	1,830	1,820
Venezuela	1,850	2,160	1,930

¹ Projected.

implement even stricter import restraints if the costs of its imports continue spiraling. Oil exports cannot be increased significantly to raise revenue, and the heavy borrowing undertaken in 1977 proved politically unpopular and will not be repeated. Gabon's import volume will be down 14 percent in 1978, owing to both an austerity program and the nonrecurrence of imports of construction goods associated with the Organization of African Unity conference that Gabon hosted last year. In Gabon the declining value of the dollar and domestic inflation in supplier countries are affecting import prices about equally.

OPEC Economic Commission

The OPEC Economic Commission Board (ECB) met in Vienna during 14-19 November to review and discuss the economic factors pertaining to oil pricing. Normally, the primary function of the ECB is to make specific recommendations on crude oil price changes for consideration by the OPEC ministers at their next formal meeting. The ECB tends to use methodologies that substantially exaggerate OPEC's revenue losses from inflation and currency exchange movements. As a result, its findings have been discounted by many OPEC members, and its recommendations have not been followed in actual price decisions. Last week, the ECB used several different formulas in calculating OPEC's revenue losses at 29 percent to 57 percent since the January 1977 price increase. Saudi Arabia dissented from the conclusions, however, and no formal recommendations will be made to the oil ministers.



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USSR: ECONOMIC PERFORMANCE AND THE ENERGY SECTOR

The Soviet economy is experiencing another year of slowing growth. Despite the outlook for a record grain crop this year, GNP growth will probably fall below the 3.5 percent recorded in 1977. Growth in industrial output in 1978 will be less than 4 percent and could fall as low as 3.5 percent. Except for gains in steel output and electricity production that followed exceptionally poor performances last year—all branches of industry are running behind the pace of the first three quarters of 1977.

The energy sector is among the laggards. The growth in primary energy production this year will be only about 4 percent, compared with a 5 percent rise in 1977. For the first nine months of 1978, coal production has actually declined in absolute terms from the same period in 1977.

No clear Soviet strategy has emerged to deal with the formidable and growing problems. The Soviets already are experiencing a slowdown in capital formation and labor force growth, a declining return on investment, and regional imbalances in labor, plant and equipment with no relief in sight. The slowdown in production of capital goods will mean continued slow growth of investment. At the same time, a larger share of investment resources will be needed for Siberian oil and gas development, while returns on this investment will fall with declining oil production in the 1980s.

Energy Sector

Moscow has been responding to short-term needs for oil with measures that are wasteful and will hinder a transition to a balanced long-term energy strategy. Since 1977, the leadership has adopted a crisis management approach; it has rushed additional men and equipment into the Tyumen Oblast to step up drilling and recovery operations. Attempts are being made to open a number of smaller fields in Tyumen at the expense of production at some of the older producing regions. The rationale for this commitment to Tyumen oil is questionable. Even now, these fields are not being brought on stream as rapidly as planned, and the Soviets are overproducing already developed fields in an attempt to keep oil output rising. As a result, these fields, as well as Samotlor, which produces about one-fourth of all Soviet oil, will decline very sharply in the early 1980s. Several West Siberian fields have already begun to decline. Ust Balyk, once West Siberia's second largest field with output of some 280,000 b/d in 1974, is only producing less than 100,000 b/d this year.

The increasingly heavy commitment of resources to oil production in West Siberia is unlikely to prevent a serious decline in Soviet ability to export oil in the 1980s. Moreover, the push in West Siberia, given limits on investment funds, could

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slow progress toward boosting coal or natural gas output. Delays in solving problems associated with increased use of Kansk-Achinsk coal—such as development of suitable generating equipment, high-voltage electricity transmission, and either slurry or capsule pipelines—preclude any large-scale substitution of coal for oil for at least a decade.

The only way the USSR will be able to maintain a continuing increase in total energy production in the 1980s is by emphasizing natural gas production. Provided gas reserves are close to official claims, large gains in output from Tyumen and Astrakhan would be required. But the accompanying demands for equipment would place an acute strain on the steel industry and on industries producing compressors and other equipment for gas production, transmission, and consumption.

Foreign credits to hasten the import of large-diameter pipe and compressors might prove critical. By stressing development of Tyumen oil at present, Brezhnev has heightened the need for a broad range of technology, much of which will have to be imported if the best results are to be obtained as quickly as possible. A step-up in orders for imported oil- and gas-related equipment is already evident.

Oil and Natural Gas Equipment Orders

Although total hard currency orders for machinery and equipment from Western suppliers during the first nine months of 1978 are down by 22 percent—nearly \$560 million—from the same period in 1977, orders for oil and gas equipment have more than tripled.

Oil and gas equipment was responsible for almost all of the increase in contracts for US equipment, which, in the first nine months of 1978, were more than double the

USSR: Hard Currency Orders for Machinery and Equipment,
January-September

	Million US \$	
	1977	1978
Total	2,572	2,013
Oil and natural gas ¹	233	779
Chemical and petrochemical	1,199	562
Metalworking and metallurgy	237	103
Electronic (including computers)	113	100
Mining and construction	136	40
Food processing	137	17
Other	517	412

¹ Including pipeline equipment but excluding pipe.

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January-September level of 1977. Soviet orders placed in the United States include a \$158 million contract for a drilling plant to be erected at Kuybyshev by Dresser Industries.

In order to slow the growth of the Soviet debt, Moscow has scaled down the size of some major projects involving Western equipment and technology. A notable example is the recently signed order for \$200 million to \$250 million in gas-lift equipment to be used at the Samotlor and Fedorovo oilfields in West Siberia. When the Soviets began shopping for the project in 1975, Moscow reportedly was looking for about \$500 million worth of Western equipment.

Although US-produced oil and gas equipment is preferred by Moscow, and Soviet orders in this area are on the rise, export restrictions and the lack of credits backed by the US Government will continue to limit sales. Export restrictions, for example, were a major factor in Moscow's decision to order the gas-lift equipment for the Samotlor and Fedorovo oilfields from a French-led consortium, which guaranteed an "all-European" package, rather than to accept the offer of a Japanese consortium, which included several US-based subcontractors.

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JAPAN: INDEPENDENT URANIUM ENRICHMENT CAPABILITY

In the latest step toward its goal of developing a self-sufficient nuclear fuel cycle capability, Japan expects to begin enriching uranium next year in a gas centrifuge pilot plant now under construction. To head off any potential adverse recommendation from the International Nuclear Fuel Cycle Evaluation (INFCE), which concludes in February 1980, the Japanese have accelerated construction to demonstrate an enrichment capability before that time. The facility located at Ningyo Pass, will be expanded into a larger, but still only demonstration-size, plant to be built by the late 1980s; a full-scale plant is planned for completion by 1995.

Although in the late 1980s and 1990s, the Ningyo Pass facility will have the potential capacity to provide about one-half of Japanese enrichment needs, Japan's nine major utilities already are committed to foreign contracts—primarily with the United States—for all their enrichment requirements. Indeed, Japan will have an oversupply of foreign enrichment services at least through 1989—largely because delivery commitments are based on a nuclear power program that is now lagging. This redundancy apparently reflects Japan's desire to insure against even the remote possibility of future shortages of enrichment services.

29 November 1978

SECRET

11

SECRET

Nuclear Power Program

The world economic downturn in 1974 led the Japanese to cut back their ambitious nuclear power plans drastically as major energy-consuming industries—mainly steel and petrochemicals—faltered. The revised long-range program adopted last September calls for nuclear power capacity of 27,000 to 33,000 megawatts (MWe) by 1985 and 60,000 MWe by 1990—about 60 percent of the original targets.

Construction of nuclear facilities has fallen considerably behind even these scaled-down goals. Lower projections of future electricity demand, skyrocketing construction costs, and public opposition to new nuclear power plant development all have contributed to the slowdown. Japan is unlikely to have more than 21,000 MWe of nuclear generating capacity on stream by 1985; probable capacity for 1990 is 29,600 MWe.

Japan: Projected Nuclear Generating Capacity and Enrichment Services

	Installed Capacity ¹ (Thousand MWe)	Enrichment Services (Million SWU) ²		
		Requirements	Foreign Supply Commitments	Surplus
1978.....	12.2	0.8	1.2	0.4
1979.....	14.5	1.2	1.2	0
1980.....	14.5	1.6	1.8	0.2
1981.....	15.0	1.4	2.9	1.5
1982.....	17.1	1.5	3.8	2.3
1983.....	18.2	2.2	4.7	2.5
1984.....	20.1	3.0	5.1	2.1
1985.....	21.2	2.2	6.6	4.4
1986.....	22.6	2.4	6.1	3.7
1987.....	23.4	3.1	6.0	2.9
1988.....	25.3	2.9	6.5	3.6
1989.....	27.4	2.5	6.3	3.8
1990.....	29.6	2.6	5.1	2.5

¹ Yearend.

² Separative work units.

Domestic Enrichment Capability

Japan's pilot uranium enrichment plant at Ningyo Pass will use centrifuge technology believed to be comparable to current technology of URENCO—the West German-British-Dutch enrichment consortium. By 1981, the plant will have a production capacity of 50,000 separative work units (SWU) * annually, sufficient only

* A separative work unit is a measure of the effort required to separate uranium isotopes in the enrichment process.

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to provide one-half of the annual fuel requirements of a 1,000-MWe light water reactor.

The Power Reactor and Nuclear Fuel Development Corporation (PNC)—the quasi-governmental organization created to implement Japan's nuclear program—is responsible for developing an enrichment capability. Since the enrichment program was adopted formally in 1972, PNC has been operating test cascades at the Tokai Mura Nuclear Research Center to determine centrifuge performance, endurance, and reliability under operating conditions. Technical feasibility has been demonstrated, and the Japanese now are emphasizing the development of mass production techniques aimed at reducing unit costs for the centrifuges.

By the late 1980s, Japan probably will complete a large demonstration enrichment facility capable of producing 1 million SWU annually, even though its requirements for an estimated 2.7 million SWU annually in 1986-89 will have already been filled by foreign suppliers. By 1995, according to Japanese plans, a full-scale commercial plant will be built with a capacity of 5 million SWU per year. It seems reasonable to assume that the capacity of this plant will develop more slowly than presently planned.

Availability of Enrichment Services

Given existing enrichment contracts and current power plant construction progress, Japan will receive from foreign suppliers, by 1990, about twice the cumulative enrichment services required for its online nuclear capacity. We estimate contract commitments in the 1978-90 period at 57.3 million SWU versus projected enrichment needs of only 27.4 million SWU. Current Japanese contracts for uranium enrichment services—more than 80 percent with the United States—dovetail with requirements for the originally planned nuclear generating capacity of about 60,000 MWe in 1985. This level is now the goal for 1990.

Japanese utilities have total commitments of nearly 80 million SWU from foreign suppliers through about 2015. Most of this probably will not be needed to meet reactor requirements until after 1990.

Because of slippages in the nuclear power plant program, the Japanese probably will request delays in some scheduled deliveries of foreign enrichment services. But Japanese utilities have shown no inclination to back out of existing contracts with their enrichment suppliers. Moreover, last August, in order to reduce the Japanese trade surplus, Tokyo agreed to about a \$1 billion prepayment for existing enrichment contracts with the United States covering about 13 million SWU.

SECRET

By March 1979, Japan plans to establish a joint government-private sector stockpiling company to handle the accumulated surplus uranium. This is an essential feature of Tokyo's program to ensure power reactor fuel security. The Japanese are studying the feasibility of a 1,000-ton reserve, primarily consisting of enriched uranium.

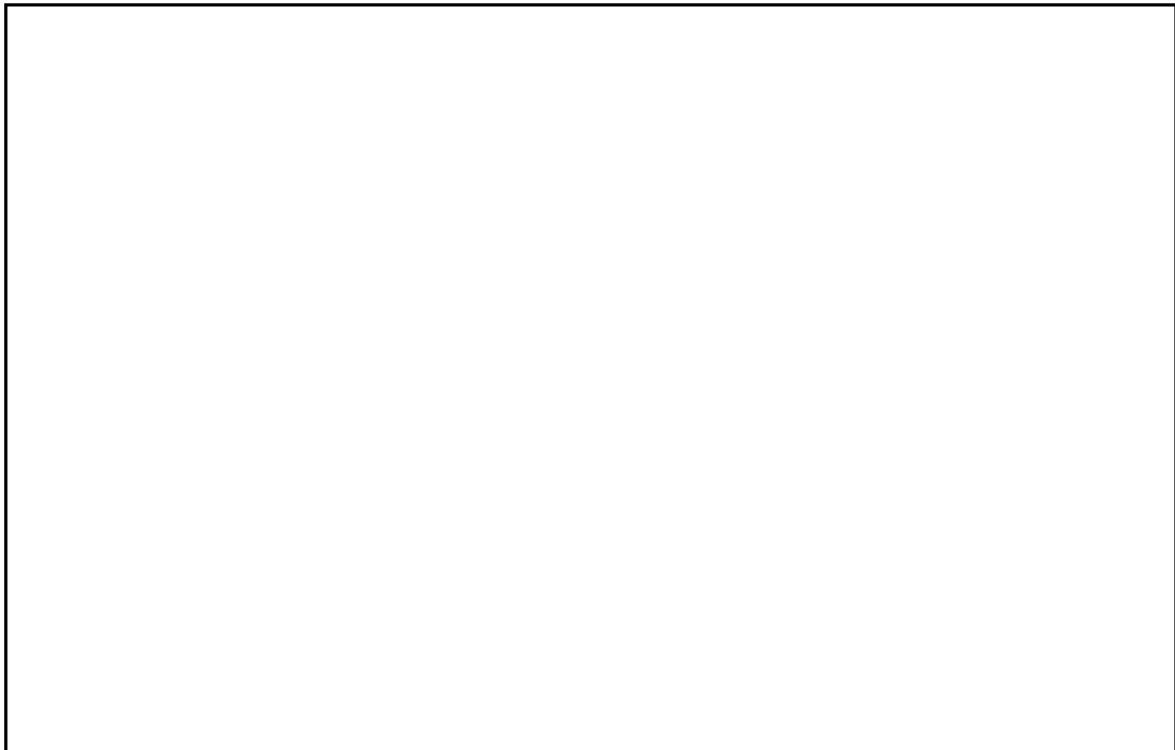
Perspective From Tokyo

The Japanese want a national enrichment facility for the flexibility it will provide as Japan moves toward developing an independent nuclear fuel cycle. US enrichment services are supplied under strict safeguards giving the United States control over the disposition of the spent fuel. Japan is concerned that the United States may continue to press for further limitations on reprocessing of Japanese spent fuel.

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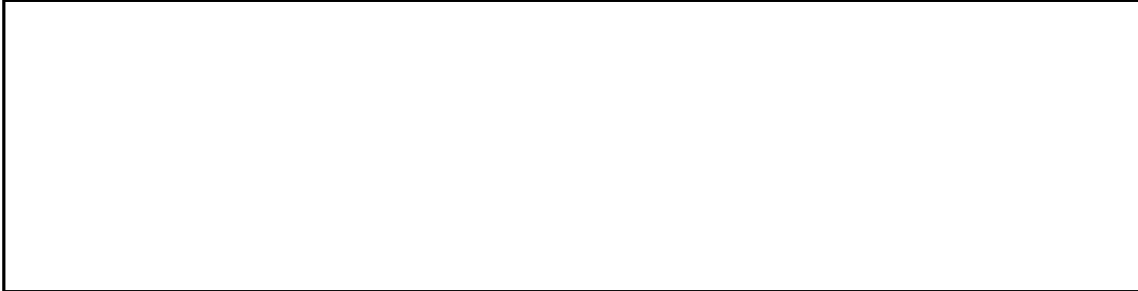
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CHINESE OIL TRICKLES INTO UNITED STATES

China has found a niche for some of its low-sulfur crude in the crowded US west coast market. The sale of 3.6 million barrels of Ta-ch'ing crude to Coastal States Gas Corporation, however, represents only a small expansion of Chinese exports that already averaged about 266,000 b/d in 1978.

US Markets

Previous Chinese overtures to sell crude to two large US companies for the continental US market had been unsuccessful. Although the low sulfur content of the Chinese export crudes makes them suitable for processing into fuel oil—a California refinery reportedly will process the oil imported by Coastal States into fuel oil—the Chinese oils are hard to market because of their high-pour points, high paraffin content, and low distillate yields. The few large customers for low-sulfur fuel oil markets in California are already well served by high-quality Indonesian Minas crude. Most of the US market for fuel oil is along the east coast, and Chinese oil cannot be

	China: Oil Exports					
	Thousand Barrels per Day					
	1973	1974	1975	1976	1977	1978 ¹
Total	37.8	111.7	210.2	192.4	215.6	265.8
Japan	20.6	79.3	158.5	123.4	134.5	136.0
Philippines	0	2.0	8.3	11.3	16.9	24.0
Thailand	0.4	0.8	1.1	5.8	6.1	16.8
Romania	0	0	4.7	9.1	9.8	20.0
Hong Kong	0.8	6.6	13.1	12.3	18.3	19.0
Brazil	0	0	0	0	0	20.0 ²
Other ³	16.0	23.0	24.5	30.5	30.0	30.0

¹ Projected.

² Barter for iron ore.

³ Mostly to North Korea and Vietnam.

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shipped there economically because the Panama Canal cannot accommodate supertankers.

Although, given the increasing contacts between the United States and China, more Chinese sales of crude to US companies are a good possibility, the amount going to the continental United States will remain small. US companies, as has been the case in recent years, will find it easier to dispose of Chinese crudes in nearby countries such as Japan, South Korea, and Australia.

Overall Export Outlook

Our latest projections for Chinese oil supply and demand through 1985 indicate that Peking will be able to increase exports only gradually. The Sino-Japanese Long Term Trade Agreement, signed in February 1978, commits Japan to take increasing amounts of Chinese crude. By 1982 Japan will purchase 300,000 b/d of the anticipated 500,000 b/d that China probably will have available for export.

China faces an uphill struggle to find markets for the remainder. Many deals of the size of the one with Coastal States probably will be needed, and the Chinese may resort more to barter arrangements such as the 1978 contract with Brazil to swap Sheng-li crude for iron ore. Even if Peking sells all the oil it will have available for export in 1982, Chinese oil would still amount to only 1 to 2 percent of world oil trade.



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SWEDEN'S NUCLEAR POWER PROGRAM

An article entitled "Sweden: Road Cleared for Further Nuclear Development" in the 1 November issue of the *International Energy Biweekly Review* (IEBR) discussed the attitudes of Swedish political parties toward nuclear energy in Sweden and the outlook for the Swedish nuclear program. The article implicitly concluded that the resignation of Prime Minister Falldin would probably lead to completion of Sweden's 13-reactor program, originally proposed in 1975.

In mid-November the new Swedish Government announced that only 11 reactors would be completed. Swedish energy projections supplied to the International Energy Agency in September and based on the 13-reactor program show nuclear energy providing 21 percent of total energy demand in 1990. With 11 reactors operating, nuclear energy's share would be reduced to 16 percent, making Sweden's goal of

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Sweden: Nuclear Power Program

	Reactor Type ¹	Capacity (Net megawatts)	Year of Commercial Operation
Operating		3,764	
Oskarshamn-1	BWR	440	1971
Oskarshamn-2	BWR	580	1974
Ringhals-1	BWR	762	1976
Ringhals-2	PWR	822	1975
Barseback-1	BWR	580	1975
Barseback-2 ²	BWR	580	1977
Subtotal		3,764	
Completed		1,811	
Ringhals-3 ³	PWR	912	1979(?)
Forsmark-1	BWR	899	1979(?)
Subtotal		5,575	
Under Construction		2,871	
Ringhals-4	PWR	912	1980
Forsmark-2	BWR	899	1982
Forsmark-3	BWR	1,060	1984
Subtotal		8,446	
Originally Planned		2,120	
Oskarshamn-3	BWR	1,060	
Forsmark-4	BWR	1,060	
Total		10,566	

¹ BWR—boiling water reactor (ASEA-Atom, Sweden). PWR—pressurized water reactor (Westinghouse, United States).

² Government permission to operate until end of 1979.

³ Awaiting government approval for fuel loading.

reducing oil imports harder to achieve. The 12th and 13th reactors could have supplied the equivalent of 65,000 b/d of oil.



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In summary, while the replacement of the Falldin government by the Ullsten government will undoubtedly result in some easing of the Swedish posture toward nuclear power, impediments continue to exist in a much more complex political environment than the Review article would seem to imply.



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